(k) A space, except those under paragraphs (e) through (j) of this section, that has a direct opening to a gas-dangerous space or zone may only have the electrical equipment allowed in the gas-dangerous space or zone.

§ 154.1015 Lighting in gas-dangerous space.

(a) Each gas-dangerous space that has lighting fixtures must have at least two branch circuits for lighting.

(b) Each switch and each overcurrent protective device for any lighting circuit that is in a gas-dangerous space must open each conductor of the circuit simultaneously.

(c) Each switch and each overcurrent protective device for lighting in a gas-dangerous space must be in a gas-safe space.

§ 154.1020 Emergency power.

The emergency generator must be designed to allow operation at the final angle of heel under § 154.230(a).

FIREFIGHTING

Firefighting System: Exterior Water Spray

§ 154.1105 Exterior water spray system: General.

Each liquefied flammable gas vessel and each liquefied toxic gas vessel must have an exterior water spray system that meets §§ 154.1110 through 154.1135.

§ 154.1110 Areas protected by system.

Each water spray system must protect:

(a) All cargo tank surfaces that are not covered by the vessel's hull structure or a steel cover;

(b) Each cargo tank dome;

(c) Each on-deck storage vessel for flammable or toxic liquefied gases;

(d) Each cargo discharge and loading manifold;

(e) Each quick-closing valve under §§ 154.530, 154.532, and 154.538, and other control valves essential to cargo flow;

(f) Each boundary facing the cargo area of each superstructure that contains accommodation, service, or control spaces;

(g) Each boundary facing the cargo area of each deckhouse that contains accommodation, service, or control spaces; and

(h) Each boundary of each deckhouse that is within the cargo area and that is manned during navigation of the vessel or during cargo transfer operations, except the deckhouse roof if it is 2.4 m (8 ft.) or higher above the cargo containing structure.

[CGD 74–289, 44 FR 26009, May 3, 1979; 44 FR 59234, Oct. 15, 1979]

§ 154.1115 Discharge.

(a) The discharge density of each water spray system must be at least:

(1) 10000 $cm^3/m^2/min.$ (0.25 $gpm/ft.^2$) over each horizontal surface; and

(2) 4000 $cm^3/m^2/min.$ (0.10 $gpm/ft.^2$) against vertical surface, including the water rundown.

(b) The water spray protection under § 154.1110 (d) and (e) must cover an area in a horizontal plane extending at least 0.5 m (19 in.) in each direction from the pipes, fittings, and valves, or the area of the drip tray, whichever is greater.

§ 154.1120 Nozzles.

(a) Nozzles for the water spray system must be spaced to provide the minimum discharge density under § 154.1115 in each part of the protected area.

(b) The vertical distance between water spray nozzles for the protection of vertical surfaces must be 3.7 m (12 ft.) or less.

§ 154.1125 Pipes, fittings, and valves.

(a) Each pipe, fitting, and valve for each water spray system must meet Part 56 of this chapter.

(b) Each water spray main that protects more than one area listed in § 154.1110 must have at least one isolation valve at each branch connection and at least one isolation valve downstream of each branch connection to isolate damaged sections.

(c) Each valved cross-connection from the water spray system to the fire main must be outside of the cargo area.

(d) Each pipe, fitting, and valve for the water spray system must be made of fire resistant and corrosion resistant materials, such as galvanized steel or galvanized iron pipe.

(e) Each water spray system must have a means of drainage to prevent corrosion of the system and freezing of

accumulated water in subfreezing temperatures.

(f) Each water spray system must have a dirt strainer that is located at the water spray system manifold or pump.

§ 154.1130 Sections.

(a) If a water spray system is divided into sections, each section must at least include the entire deck area bounded by the length of a cargo tank and the full beam of the vessel.

(b) If a water spray system is divided into sections, the control valves must be at a single manifold that is aft of the cargo area.

§ 154.1135 Pumps.

(a) Water to the water spray system must be supplied by:

(1) A pump that is only for the use of the system;

(2) A fire pump; or

(3) A pump specially approved by the Commandant (G-MSO).

(b) Operation of a water spray system must not interfere with simultaneous operation of the fire main system at its required capacity. There must be a valved cross-connection between the two systems.

(c) Except as allowed under paragraph (d) of this section, each pump for each water spray system must have the capacity to simultaneously supply all areas named in § 154.1110.

(d) If the water spray system is divided into sections, the pump under paragraph (a) of this section must have the capacity to simultaneously supply the required discharge density under § 154.1115(a) for:

(1) The areas in §§ 154.1110(f) through (h) and 154.1115(b); and

(2) The largest section that includes the required protection under § 154.1110 (a), (b), and (c).

[CGD 74–289, 44 FR 26009, May 3, 1979, as amended by CGD 82–063b, 48 FR 4782, Feb. 3, 1983]

FIREFIGHTING SYSTEM: DRY CHEMICAL

§ 154.1140 Dry chemical system: General.

Each liquefied flammable gas carrier must have a dry chemical firefighting system that meets §§ 154.1145 through 154.1170, Part 56 and Subpart 162.039 of this chapter.

§ 154.1145 Dry chemical supply.

(a) A vessel with a cargo carrying capacity less that 1000 m^3 (35,300 $ft.^3$) must have at least one self-contained dry chemical storage unit for the cargo area with an independent inert gas pressurizing source adjacent to each unit.

(b) A vessel with a cargo carrying capacity of 1000 m^3 (35,300 $ft.^3$) or more must have at least two self-contained dry chemical storage units for the cargo area with an independent inert gas pressurizing source adjacent to each unit.

(c) A vessel with bow and stern loading and discharge areas must have at least one self-contained dry chemical storage unit with an independent inert gas pressurizing source adjacent to the unit for each area.

(d) Each dry chemical storage unit and associated piping must be designed for:

(1) Sequential discharge of each hose line and each monitor for 45 seconds; and

(2) Simultaneous discharge of all hose lines and monitors for 45 seconds.

(e) Each fully charged dry chemical storage unit must have the greater of the following:

(1) Enough dry chemical to provide for sequential discharge of each attached hose and monitor for 45 seconds.

(2) Enough dry chemical to provide for simultaneous discharge of all attached hoses and monitors for 45 seconds.

§ 154.1150 Distribution of dry chemical.

(a) All locations on the above deck cargo area and the cargo piping outside that cargo area must be protected by:

(1) At least two dry chemical hand hose lines; or

(2) At least one dry chemical hand hose line and one dry chemical monitor.

(b) At least one dry chemical storage unit and hand hose line or monitor must be at the after end of the cargo areas.